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SEP 26 1917

Guide to Good Stucco

with Specifications

The Atlas Portland Cement Company

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*Atlas-White Stucco Home
Kansas City, Mo.
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STUCCO HOMES, KANSAS CITY, MO.
C. N. LAKE, ARCHITECT
M. F. BURNS, STUCCO CONTRACTOR





ANOTHER GROUP OF STUCCO HOMES IN KANSAS CITY CONSTRUCTED WITH ATLAS WHITE CEMENT

The Growth of Stucco

OVER 3,000 stucco homes and garages have been built in Minneapolis, St. Paul, Kansas City and Buffalo alone. Many thousands more have been built in cities, towns and country throughout the United States—a development significant to every contractor and builder who is interested in home construction.

The increasing demand for good stucco is due to the fact that it gives lasting satisfaction to the owner, and, therefore, more satisfaction (and fewer complaints) to the builder or contractor.

Stucco affords a beautiful and distinctive home, at moderate cost, and requires almost no upkeep. Well-built, it is cool in summer, easy to heat in winter and will not crack. It resists fire and, in some forms, is fireproof. In the long run stucco is the least expensive and most satisfactory home construction for most people.

More Business for Contractors

Considering the increasing cost of wood and brick homes, together with the economy and fire-resisting qualities of good stucco,

the indications point to even more rapid increase in the use of stucco. Additional impetus has been given this growth by the use of white cement in the finish coat, in either pure white or with mineral color pigments, lending new and distinctive charm and beauty to this economical material.

The growing interest in stucco has resulted in business for the contractors in two ways—the erection of new homes, garages, etc., and the renovation of old frame and brick homes. Both fields offer plenty of profitable opportunities to the increasing number of contractors who understand stucco construction.

The purpose of this book is to furnish the latest information and data available to ensure good stucco results.

Materials for Stucco Construction

Stucco is a mixture of Portland cement, sand, lime and water.

The sand must be free from impurities like loam, salt, vegetable or other deleterious matter, and must be properly graded.

The addition of one part of lime to about ten parts of cement makes the stucco more impervious to moisture, and at the same time fattens the mortar so that it will cover more surface and work easily under the float.

The *lime* added to the mixture may be either hydrated lime or slaked lump lime.

The advantage of using *hydrated lime* is that the slaking or hydrating is done mechanically, with the result that the lime is thoroughly slaked, and is never burned. There is no danger of placing any unslaked material in the mortar, and the hydrated lime never air slakes.

If ordinary *lump lime* is used, a good double strength lime is slaked in plenty of water and stirred just enough to prevent the large lumps from burning. After being allowed to stand for a week or ten days it is ready for use. The lump lime should be slaked in a box raised slightly from the ground, one end being lower than the other, so that the slaked lime will run off. The lower end should have a sliding door, with the opening covered with a coarse wire screen, which acts as a strainer and prevents any unslaked lime from leaving the box. After the lime has completely slaked it is run off into a crater of sand and the lime and sand are thoroughly mixed, enough sand being used to form a thick paste. About one part of lime putty to nine parts of sand

is needed. The cement and the remainder of the sand are added just before the mortar is applied.

Hair or fibre is frequently used in the first stucco coat, the best results being obtained with first quality long cattle or goat hair, or a long fibre well combed out. These should be free from foreign matter.

The *water* used for mixing must contain no oil, acid, strong alkalies or vegetable matter. The presence of these will retard the setting of the mortar and will permanently weaken the stucco wall.

Mixing Stucco Mortar

The proportions for the mix are three parts of sand for the first two coats and two and one-half parts of sand for the third coat to one part of Portland cement; and one part of lime to ten of cement. Measuring is done by volume. A bag of cement (94 pounds net) is assumed to contain one cubic foot. Lime is measured in the form of putty.

Mixing should be done on a water-tight platform to prevent any loss of water after the proportions of the mix have been secured. The mixing must be continued until the mortar is of a uniform color, the cement and lime being then uniformly distributed. The hair or fibre is added at this time.

Three Kinds of Stucco

Stucco construction properly falls under three heads:

- (1) On wood or metal lath or stucco board—*with wood sheathing*,
- (2) On brick, stone, tile, or cement blocks.
- (3) On ribbed metal lath—*without wood sheathing*.

With wood lath the sheathing is nailed to the studs, then covered with sheathing paper; vertical wood furring strips are applied, and the lath put horizontally on the furring strips.

The wood lath should be thoroughly

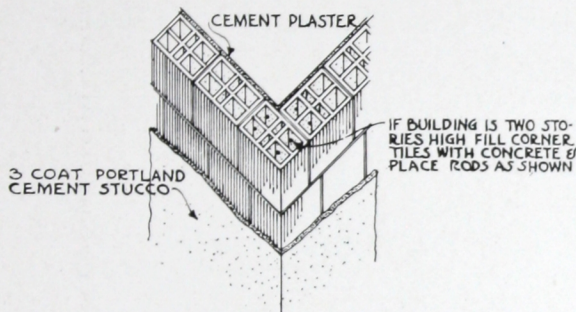


ATLAS-WHITE STUCCO RESIDENCE, SPRINGFIELD, O.
W. K. SHILLING, ARCHITECT
W. E. WHITE, STUCCO CONTRACTOR

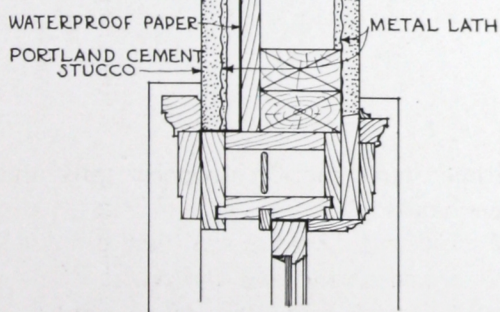
CEMENT PLASTER
METAL LATH
BUILDING PAPER
2X3 BRACING
2X4 STUDS 16" C.C.
RIBBED LATH NAILED TO STUDS
3 COAT CEMENT STUCCO

VERTICAL SECTION SHOWING RIBS IN LATH

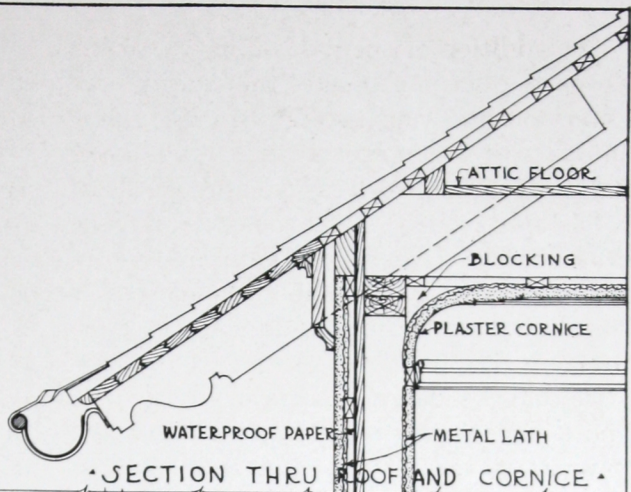
• DETAIL FOR STUCCO ON LATH WITHOUT SHEATHING •



• DETAIL FOR STUCCO ON TILE •

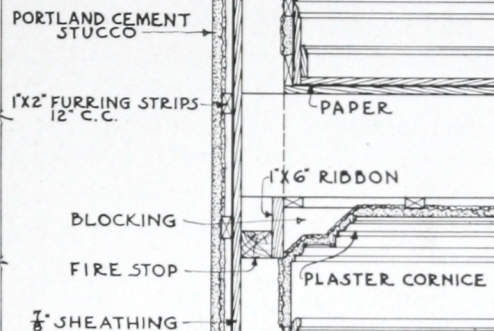


• SECTION THRU WINDOW JAMB •



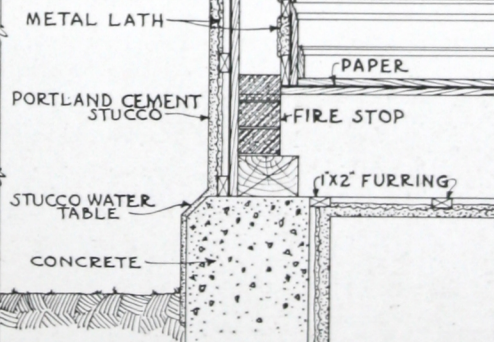
• SECTION THRU ROOF AND CORNICE •

• SECTION AT FLOOR •



• SECTION AT CEILING •

• SECTION AT WATER TABLE •



• SECTION THRU STUCCOED WALL WITH METAL LATH ON SHEATHING •

THE ATLAS-WHITE STUCCO HOME PORTFOLIO WILL BE SENT, UPON REQUEST FROM YOU, TO ANY OF YOUR CLIENTS WHO ARE THINKING OF BUILDING A HOME

saturated with water before the plaster is applied, or the moisture will be absorbed from the mortar. Another method of preparing wood lath is to paint it with two coats of any of the reputable bitumen waterproof paints to which mortar adheres. After twenty-four hours and within six days of the application of the bitumen paint, the stuccoing should be started.

Patent Stucco Board is sometimes used in place of wood lath, and costs less than metal lath. Care, however, should be exercised to avoid the cheap variety which is unsafe. Manufactured stucco-board requires no furring and comes ready for the application of the first coat.

The disadvantages of stucco on wood lath and stucco board is that, under changing conditions of weather and temperature, the wood sheathing and lath expand, whereas the stucco contracts, or vice versa; thereby increasing the possibility of cracking. In spite of this fact, stucco on wood lath has given satisfaction in many instances, but the safe way is to use a metal lath on a sheathed and furred base or metal lath with ribs of sufficient height and stiffness to eliminate sheathing and furring.

Metal lath on wood sheathing is a far sounder practice than wood lath on wood sheathing. Two kinds are in use, expanded metal lath and close-meshed wire lath. The

expanded metal type consists of metal sheets about 1-40 inch in thickness, which are slotted and expanded to form mesh of various shapes. Woven wire lath is a close-mesh wire cloth provided with V-shaped metal stiffeners. Most metal laths are now manufactured with raised ribs, designed to be applied directly to the sheathing, and thus do away with furring. This greatly increases the speed of erection and reduces the cost.

In applying the stucco to metal lath the mortar should be thoroughly pushed through against the inside waterproofing so as to completely embed the metal of the lath on both sides. If furring strips are used, special care should be taken to fill all voids around the furring strips and where laths lap.

On new brick, stone, tile or cement block surfaces, the stucco mortar is applied directly to the material, care being taken that the surfaces have ample roughness or absorption to assure a strong bond and key with the stucco. Standard specifications prescribe that the mortar joints should not be less than $\frac{3}{8}$ -inch thick and the mortar should be omitted from or raked out of the joints for at least $\frac{1}{2}$ -inch back from the face to which the stucco is applied. The surface should be thoroughly cleaned and saturated with water just before the first coat is applied. The stucco is then forced into the joints.

Solid stucco construction has grown with the development of rib-reinforced metal laths. Sheathing is entirely eliminated. The ribbed metal lath is attached (ribs inward) direct to the studding, the ribs acting as furring and reinforcement. The metal lath is plastered both back and front, forming a solid slab of reinforced Portland cement mortar, two inches in thickness. Solid stucco costs a little more than stucco on wood sheathing, but is more substantial and fireproof. It costs a little less than stucco on hollow tile, cement block or brick.



ATLAS-WHITE STUCCO RESIDENCE, SYRACUSE, N. Y.,
HARRY D. PHOENIX, ARCHITECT

Applying Stucco Mortar

It is frequently asked: How many coats of stucco should be put on? The answer is three coats for all kinds of good stucco construction. The second or backing coat should never be used for finishing. Finishing should be left to a third coat.

The first coat should be $\frac{3}{8}$ -inch thick over the face of the lath. The backing or second coat should be $\frac{3}{8}$ -inch. The final coat should be $\frac{1}{4}$ -inch.

In solid stucco, on ribbed metal lath without sheathing, the first coat is $\frac{3}{8}$ to $\frac{1}{2}$ -inch, and is back-plastered to the same amount; the second coat is $\frac{3}{8}$ to $\frac{1}{2}$ -inch; the third or finishing coat should not be less than $\frac{1}{4}$ -inch.

The thickness of the coats and the care with which they are applied give stucco its durability. The treatment of the finishing coat gives stucco its beauty and distinction. The beauty of stucco surfaces depends largely upon the skill of the manipulator. Fortunately, there are a number of standard finishes which can be satisfactorily produced without great experience.

White cements have been used as a final coating to give a wide variety of finishes and colors. This feature brings an additional element into play in the beautifying of home exteriors.

Stucco Finishes

The following finishes are applicable to both the gray Portland cement stucco and to white finishes procured through the use of Atlas White Portland Cement. They derive their names, as will be seen, from the methods used to create the proper surface.

Smooth Troweled—The finishing coat is troweled smooth with a metal trowel, with as little rubbing as possible.

Stippled—The finishing coat is troweled smooth with a metal trowel, with as little rubbing as possible, and then shall be lightly



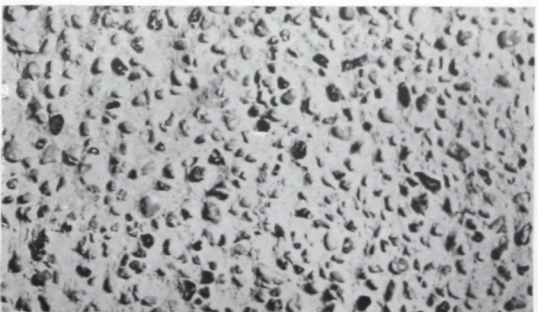
Stippled Stucco Finish



Spatter Dash Stucco Finish



Floated Stucco Finish



Pebble Dash Stucco Finish

THESE FOUR FINISHES, TOGETHER WITH DIFFERENT TINTS, AFFORD A WIDE VARIATION IN THE FINAL COAT OF STUCCO

patted with a brush of broom straw to give an even, stippled surface.

Sand Floated—The finishing coat, after being brought to a smooth, even surface, is rubbed with a circular motion of a wood float with the addition of a little sand to slightly roughen the surface. This floating should be done within thirty minutes of the application; never later. If done after thirty minutes this disturbs the initial set of the mortar.

Sand Sprayed—After the finishing coat has been brought to an even surface, is sprayed by means of a wide, long fibre brush—a whisk-broom does very well—dipped into a creamy mixture of equal parts of cement and sand, mixed fresh every thirty minutes, and kept well stirred in the bucket by means of the whisk-broom or a paddle. This coating shall be thrown forcibly against the surface to be finished. This treatment is applied while the finishing coat is still moist and before it has attained its final set—*i.e.*, within three to five hours. To obtain lighter shades add hydrated lime of five to fifteen per cent. of the volume of the cement or use white Portland cement for last coat.

Spatter Dash or Rough Cast—After the finishing coat has been brought to an even surface and before attaining final set, it is scratched and then coated uniformly with a

mixture of one part cement and two parts of sand thrown forcibly against it to produce a rough surface of uniform texture when viewed from a distance of twenty feet. Special care must be taken to prevent the rapid drying out of this finish.

Pebble-Dash—After the finishing coat has been brought to a smooth, even surface, and before attaining initial set, clean round pebbles or other material as selected, not smaller than $\frac{1}{4}$ -inch or larger than $\frac{3}{4}$ -inch previously wetted, are thrown forcibly against the mortar so as to embed themselves in the fresh mortar. They are distributed uniformly over the surface of the final coat and may be pushed back into the mortar with a clean wood trowel, but no rubbing of the surface should be done after the pebbles are embedded.

Exposed Aggregates—The final coat for this finish is composed of an approved, selected coarse sand, marble screenings, granite screenings or other special material, in the proportion given for finishing coats. Within twenty-four hours after being applied, and troweled to an even surface, it is scrubbed with a stiff brush and water. In case the cement is too hard, a solution of one part muriatic acid in four parts of water, by volume, can be used in place of water. After the aggregate particles have been exposed uniformly by scrubbing, particular care must be taken to remove all traces of the acid by thorough spraying with a hose.

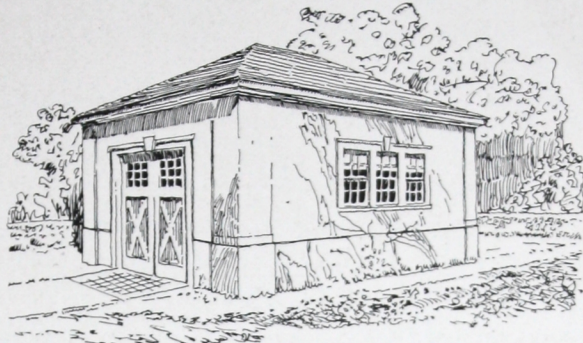
The Tinting of Stucco

Tinted Stucco, secured by the addition of coloring matter to white cements, gives a wide variation of color. In using coloring matter care should be used to select material which will be permanent—preferably creams, buffs and browns. Blacks are also safe as a rule. Ultramarine blue, if of good quality, will hold its color for a number of years, and when it begins to fade out does so evenly. It cannot be classed as a per-

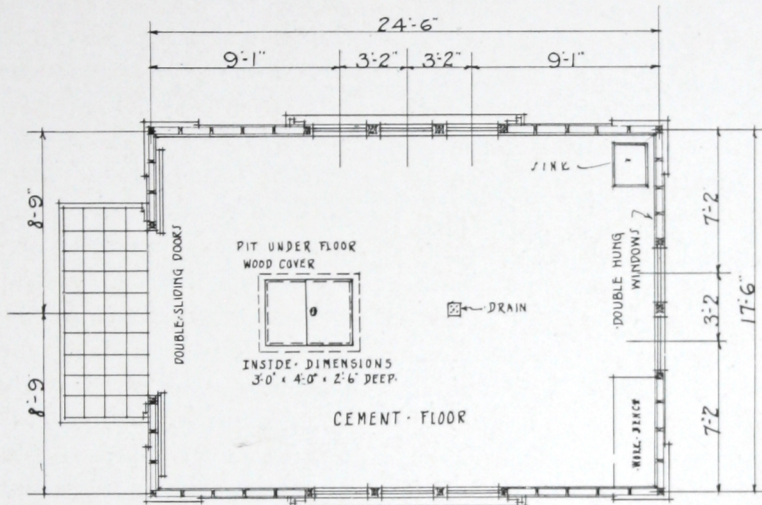


SMALL STUCCO GARAGE, PATERSON, N. J.
ECONOMICAL, FIRE-RESISTANT AND QUICKLY CONSTRUCTED

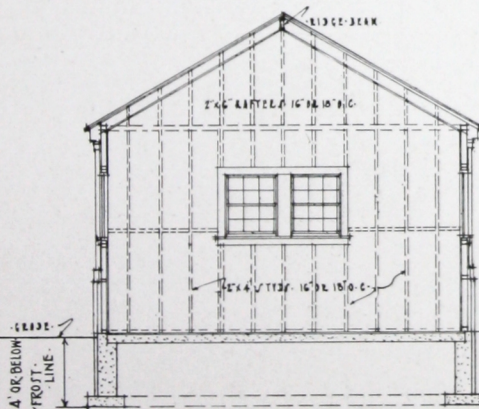
·WOOD·STUD·GARAGE·
 ·WITH·
 ·ATLAS·WHITE·STUCCO·
 ·AND·
 ·WOOD·ROOF·
 THE·ATLAS·PORTLAND·CEMENT·CO·
 ·NEW·YORK· ·CHICAGO·



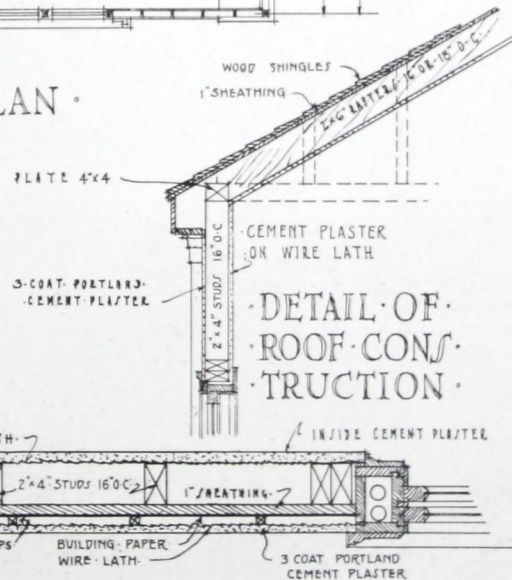
·PERSPECTIVE·VIEW·



·PLAN·



·SECTION·



·WALL·DETAIL·WITH·WIRE·LATH·

COMPLETE INFORMATION ON VARIOUS TYPES OF STUCCO AND CONCRETE GARAGES
 IS GIVEN IN ATLAS GARAGE BOOK, SENT FREE UPON REQUEST

manent color with black, brown or ochre. The following may be a helpful table of colors to those who are contemplating this interesting handling of stucco surfaces.

Color desired	Commercial names of colors for use in cement	Approximate prices per pound in 100 pound lots for high-grade		Pounds of color required for each bag of cement to secure
		Colors	Shade	Shade medium
Grays, blue-black and black.....	{ Germantown lampblack. Carbon black.....	10c. 8c.	$\frac{1}{2}$ $\frac{1}{2}$	1 1
Blue shade.....	{ Black oxide of manganese Ultramarine blue.....	6c. 18c.	1 5	2 10
Brownish-red to dull brick red...	Red oxide of iron.....	3c.	5	10
Bright red to vermillion.....	Mineral turkey red.....	15c.	5	10
Red sandstone to purplish red...	Indian red.....	10c.	5	10
Brown to reddish-brown.....	Metallic brown (oxide)....	4c.	5	10
Buff Colonial tint, and yellow.....	Yellow ochre.....	6c.	5	10
Green shade.....	Chromium oxide.....	26c.	5	10

In selecting reds and browns, it is safest to be guided by the table. A bright red shade can be produced by the ordinary oxide of iron at three and one-half cents a pound.

Yellow ochres offer a wide variety of shade and quality. French ochre, if genuine, is safe to use, and with it most attractive Colonial yellow and buff tones can be secured. It is best to know the name of the manufacturer in buying coloring material, and also whether the color was specially prepared for coloring cement.

Colors are permanent only if high-grade.



VANDEBEEK HOUSE, HACKENSACK, N. J.
BUILT ABOUT 1717
AN EVIDENCE OF THE LASTING QUALITY OF WELL-BUILT STUCCO

Guides to Good Stucco

To secure well-made stucco, the following suggestions and the specifications on opposite page are offered.

All materials should be protected when delivered for the work. Damp places should be avoided.

Under no circumstances should retempered mortar (mortar which has begun to set and is then moistened) be employed.

In all cases, the various ingredients should be thoroughly mixed and mortar made a small batch at a time. Plastering should start at the top, and be carried downward continuously without allowing the cement mortar to dry at the bottom edge. If it is impossible to work the full width of the wall at one time, the break should come at some natural division of the surface, such as window or door.

In threatening weather, all fresh surfaces should be shielded against rain.

Too rapid drying weakens the cement mortar. It should be covered with a wet canvas or the surface frequently sprayed when exposed to the sun or wind. Stucco should never be mixed or applied during freezing weather; the water will freeze before the cement mortar has set, and the latter will not harden. Artificial methods of keeping cement mixtures warm prior to application are to be discouraged. Stucco work should be planned to avoid winter weather. Nor should the cement mortar be disturbed after it has begun to set, for then its adhering quality is ruined.

In the application of the various coats, the first or scratch coat should be well roughened before the second coat is applied. Each coat should be kept damp before the application of the following coat, to prevent any absorption of water from the latter.

To obtain uniform results as to color and texture, each batch of mortar must be mixed in the same proportions as the preceding one, and *with the same amount of water.*

STUCCO SPECIFICATIONS

The following stucco specifications embody the best practices used by prominent architects.

Contractors who are interested in good stucco construction will find these suggestions of value.

Three separate columns are provided for the different types of construction, one for stucco on masonry walls, one for stucco on sheathed frame walls and the third for stucco on skeleton frame walls. Materials and methods peculiar to one form of construction occur only in its particular column. Requirements common to all forms carry across all three columns. Variable parts are in italics.

For convenience of reference, all notes have been placed immediately following the specification paragraph of which they are explanatory.

STUCCO WORK			
BRICK AND HOLLOW TILE WALLS		SHEATHED FRAME WALLS	
		SKELETON FRAME WALLS	
Scope.	1. The work required under this <i>section of the specification</i> comprises the stuccoing of all exterior wall and chimney surfaces, as shown on the drawings and hereinafter described. NOTE.—When a separate specification is written for the stucco work, the words in italics will be omitted.		
General Conditions.	2. Attention is called to the General Conditions, in the fore part of this specification, which apply equally to all trades. NOTE.—When a separate specification is written for the stucco work, the general conditions governing the work will be placed here instead of the reference in paragraph 2.		
Protection.	3. All materials shall be properly protected while stored at the site and shall not be placed on the ground. Fresh stucco shall be protected against the weather. No stucco in which cracks, pits, streaks, discolorations, or other defects may occur will be accepted.		
Cement.	4. Cement shall be Atlas Portland Cement <i>for undercoats and Atlas White Portland Cement for finish coat.</i> NOTE.—When a natural cement color is required for the stucco, instead of a white color, the words in italics will be omitted.		
Aggregate.	5. Aggregate <i>for undercoats</i> shall be thoroly clean sand, graded from fine to coarse grains, with the coarse predominating; shall be free from loam, salt, vegetable and other deleterious matter. NOTE.—The binding qualities of the cement are adversely affected unless sand is as above described; and if the sand is not naturally clean, it should be washed after its removal from the bank. By grading sand from fine to coarse, a more dense and more waterproof mortar is obtained. Paragraph 5 presupposes the use of white sand, marble screenings or other special aggregate for the finish coat of stucco. If the ordinary sand is to be used for all three coats, the words in italics will be omitted and paragraph 6 will not be used.		
	6. Aggregate for finish coat shall be thoroly clean and coarse <i>white quartz or silica sand</i> , properly graded. NOTE.—Alternatives for the material in italics are: white marble screenings, gravel grit, pink granite screenings, etc. White beach sand is usually too fine for the best results.		
Lime.	7. Lime shall be (state brand) hydrated lime. NOTE.—The admixture of a small quantity of hydrated lime in stucco mortar does not materially decrease its strength and it does, to a marked degree, increase its plasticity, making it work more freely under the trowel. As lime is an inert void filler, it renders the stucco substantially moisture-proof.		
Water-proofing Compound	8. Waterproofing compound shall be (state brand, etc.). NOTE.—Under extensive experiments, hydrated lime has proven so generally successful as a waterproofer of stucco, that we advocate its use in place of the so-called waterproofing compounds. In the cat or coats in which any of these compounds are used, the hydrated lime should be omitted.		
Color Pigments.	9. Coloring matter shall be (state brand) dry color pigments. NOTE.—When color is to be produced other than by the use of colored aggregate, mineral colors only should be employed. They should be of the highest degree of purity, of substantially the same specific gravity as the cement, and unaffected by lime, cement or the action of the elements.		
Hair.	10a. Hair shall be first quality long cattle or goat hair.	10b. Hair shall be first quality long cattle or goat hair.	
Water.	11. Water shall be clean and free from acids or strong alkalis.		
Furring.	12a. Galvanized half-inch crimped furring not lighter than 22-gauge, shall be fastened over the sheathing paper and directly along the line of the studs, using 1¼-inch 14-gauge galvanized staples, placed 12 inches apart.	12b. Galvanized half-inch crimped furring not lighter than 22-gauge, shall be fastened directly to the studding, using 1¼-inch 14-gauge galvanized staples, placed 12 inches apart.	
Lath.	13a. (Expanded Metal) Lath shall be (give maker's name) expanded metal of 24-gauge, weighing not less than 4 pounds per sq. yd., galvanized after expansion.	13b. (Expanded Metal) Lath shall be (give maker's name) expanded metal of 24-gauge, weighing not less than 4 pounds per sq. yd., galvanized after expansion.	
	14a. (Wire Cloth) Lath shall be (give maker's name) 19-gauge wire, woven 2½ meshes to the inch, galvanized after being woven.	14b. (Wire Cloth) Lath shall be (give maker's name) 19-gauge wire, woven 2½ meshes to the inch, galvanized after being woven.	

Lath.
Continued.

Mortar.

Mixing.

Mortar
Applica-
tion.

BRICK AND HOLLOW TILE WALLS	SHEATHED FRAME WALLS	SKELETON FRAME WALLS
	<p>NOTE.—Paragraphs 13a and 14a are alternatives. An improved form of construction, taking the place of the furring (paragraph 12a) and the lath (paragraph 13a or 14a) is an expanded metal lath combining furring in the form of an integral stiffening rib, or a wire cloth with a V-stiffening.</p> <p>15a. Place lath horizontally over the furring, driving 1¼-inch 14-gauge galvanized staples 8 inches apart over the furring. The sheets of lath shall be locked or lapped at least 1-inch and tied at joints between studs, both vertically and horizontally, with 18-gauge wire. The lath shall be folded around the corners at least 3 inches.</p>	<p>NOTE.—Paragraphs 13b and 14b are alternatives. An improved form of construction, taking the place of the furring (paragraph 12b) and the lath (paragraph 13b or 14b) is an expanded metal lath, combining furring in the form of an integral stiffening rib, or a wire cloth with a V-stiffening.</p> <p>15b. Place lath horizontally over the furring, driving 1¼-inch 14-gauge galvanized staples 8 inches apart over the furring. The sheets of lath shall be locked or lapped at least 1-inch and tied at joints between studs, both vertically and horizontally, with 18-gauge wire. The lath shall be folded around the corners at least 3 inches.</p>
	<p>16. Mortar for first and second coats shall be composed of one (1) part of Portland Cement, three (3) parts of sand and one-tenth (1/10) part of hydrated lime by volume.</p> <p>17a. Hair may be added to the first coat mortar but in quantity only sufficient to bond the mortar.</p> <p>NOTE.—Hair is added to the first coat of mortar on metal lath to hold the mortar together on the lath, otherwise there would be considerable waste due to the mortar dropping behind the lath, but no greater quantity than is necessary to accomplish this purpose should be used, as an excessive amount of hair will prevent the mortar from going thru the lath sufficiently to thoroly embed the metal and so preserve it from corrosion.</p>	<p>17b. Hair may be added to the first coat mortar but in quantity only sufficient to bond the mortar.</p> <p>NOTE.—Hair is added to the first coat of mortar on metal lath to hold the mortar together on the lath, otherwise there would be considerable waste due to the mortar dropping behind the lath, but no greater quantity than is necessary to accomplish this purpose should be used, as an excessive amount of hair will prevent the mortar from going thru the lath sufficiently to thoroly embed the metal and so preserve it from corrosion.</p>
	<p>18. Mortar for finishing coat shall be composed of one (1) part of <i>White Portland Cement</i>, two and one-half (2½) parts of <i>White sand</i> and one-tenth (1/10) part of hydrated lime by volume.</p> <p>NOTE.—The words in italics are variable for the reasons given in Notes 4 and 5.</p> <p>If a waterproofing compound is to be used, the reference to lime in paragraph 18 should be stricken out and a description of the waterproofing compound inserted.</p>	
	<p>19. The finishing coat shall be brought to a tone selected by the addition of dry color in quantity not exceeding 10 per cent. of the weight of the cement.</p> <p>NOTE.—An excess of color weakens the mortar. Stucco made with <i>White Portland Cement</i> responds more quickly to color tones.</p>	
	<p>20. Proportions stated are by volume and one bag (94 pounds) cement is to be considered one cubic foot.</p>	
	<p>21. Mixing shall be done on a water-tight platform, the different constituents thoroly mixed dry to a uniform color, water then added to obtain the proper consistency and the whole turned over until the mass is uniform in color and consistency.</p>	
	<p>22. There shall not be mixed at one time more mortar than will be used within thirty (30) minutes. No retempered mortar shall be used under any circumstances.</p> <p>NOTE.—Cement is likely to take its initial set within 30 minutes after mixing, and in even less time during the hot summer months. The practice of retempering mortar after it has taken its initial set cannot be too strongly condemned.</p>	
	<p>23. The dry color in the finishing coat shall be very carefully weighed or measured and thoroly mixed with the sand. The cement and lime shall then be added and the entire mass thoroly mixed by shoveling, from one side of the platform to the other, thru a ¼-inch mesh screen; when the batch is of uniform color the water shall be added.</p> <p>NOTE.—The water, as well as the other constituents, should be carefully measured so that each batch will be of the same consistency.</p>	
	<p>24. The stucco shall be applied in three coats, each coat not less than ¼-inch or more than ⅜-inch in thickness, the whole finishing ⅝-inch thick beyond the normal masonry line. The plastering shall be carried on continuously in one general direction, without allowing the mortar to dry at the edge. Where this is impossible, the joints shall be made at a break, an opening or other natural division of the surface. Stucco shall not be applied when the temperature is below freezing. Masonry surfaces shall be cleaned and thoroly saturated with water just before the first coat of mortar is applied.</p> <p>See note following 28.</p>	<p>24b. The stucco shall be applied in three coats and back-plastered one coat, the whole finishing 1½ inches thick, with the outside surface 1-inch beyond face of studs. The finishing coat shall be not less than ¼-inch in thickness. The plastering shall be carried on continuously in one general direction, without allowing the mortar to dry out at the edge. Where this is impossible, the joints shall be made at a break, an opening or other natural division of the surface. Stucco shall not be applied when the temperature is below freezing.</p>
	<p>25. The first coat shall be applied under pressure to secure a good bond.</p>	<p>25b. The first coat shall be applied under pressure to secure a good key, and after it has set shall be back-plastered on the inside or back surface of the lath to a thickness of ½-inch.</p>

Mortar
Appli-
cation
Continued.

Surface
Finish.

Samples.

Note.

Framing.

Bridging.

Sheathing.

Water-
proofing.

Insulation.

Furring.

Sills.

BRICK AND HOLLOW TILE WALLS	SHEATHED FRAME WALLS	SKELETON FRAME WALLS
<p>26. After the first coat has set but before it has dried, the second coat shall be applied and floated to a true plane with wood screeds placed at 5-foot intervals and about openings.</p> <p>27. After the second coat has set but before it has dried, the finishing coat shall be applied and finished as hereinafter specified.</p> <p>28. The undercoats shall be cross-scratched before the initial set has taken place and shall be thoroly wetted before the succeeding coats are applied. The finishing coat shall be kept moist for at least two days, either by gently spraying with water after the mortar has hardened sufficiently to permit it or by hanging wet burlap or other fabric over the surface.</p> <p>NOTE.—To fully develop its binding properties, cement requires moisture continuously during the period of crystallization. For this reason masonry surfaces and undercoats are saturated so that they will not absorb the water from succeeding coats and the finish coat is kept moist by either gently spraying the stucco itself or by soaking burlap curtains hung about 6 inches away from the stucco. The latter provision is particularly necessary during the hot summer months in order to prevent the evaporation of the water in the finished surface, which is the cause of crazing or hair cracking.</p> <p>29. (Smooth Troweled). Finishing coat must be smoothed with a metal trowel, with as little rubbing as possible.</p> <p>30. (Stippled). Finishing coat shall be smoothed with a metal trowel, with as little rubbing as possible, and then shall be lightly patted with a brush of broom straw to give an even stippled surface.</p> <p>31. (Sand Floated). Finishing coat, after being brought to a smooth even surface, shall be rubbed with a circular motion of a wood float. This floating shall be done when mortar has partially set and a little sand shall be used to slightly roughen the surface.</p> <p>32. (Sand Sprayed.) After the finishing coat has been brought to an even surface, it shall be coated with a creamy mixture of equal parts of <i>white</i> cement and <i>white</i> sand, mixed fresh in a bucket every thirty (30) minutes and kept well stirred. This mixture shall be forcibly thrown from a whisk broom against the finishing coat while it is still moist and before it has attained its final set.</p> <p>33. (Rough Cast.) After the finishing coat has been brought to an even surface and before attaining its final set, it shall be uniformly coated with a mixture of one (1) part <i>white</i> cement to two (2) parts <i>white</i> sand, thrown forcibly against the wall in such a manner as will produce a rough surface of uniform texture.</p> <p>34. (Pebble Dash.) After the finishing coat has been brought to an even surface and before attaining its initial set, clean pebbles shall be forcibly thrown against the mortar and embedded therein. Pebbles shall vary in size from $\frac{1}{4}$-inch to $\frac{1}{2}$-inch, shall be well wetted before being cast and shall be uniformly distributed over the surface. They may be pressed into the mortar with a clean wooden trowel but the surface shall not otherwise be disturbed.</p> <p>35. (Exposed Aggregate.) The finishing coat within twenty-four (24) hours after it has been troweled to an even surface, shall be scrubbed with a stiff brush and until the aggregate has been uniformly exposed. Should the cement be too hard to be readily removed by water, a solution of one (1) part muriatic acid to four (4) parts of water may be used, but as soon as the aggregate has been exposed particular care shall be taken to remove all trace of the acid by spraying thoroly with clean water from a hose.</p> <p>NOTE.—The above surface finishes are alternative. Under no circumstances should the stucco be worked after it has attained its initial set.</p> <p>36. Samples of the surface finish shall be laid up well in advance of the work and the approved sample shall be carefully preserved during the prosecution of the work and used as a standard.</p>		
	<p>The success of stucco on wood frame construction is as dependent upon the character of the framework as it is of the stucco itself. A well braced and rigid framework is absolutely essential. The following provisions are presented as a standard of good practice in this regard.</p> <p>The studs should be spaced 12 inches on centers and be continuous from main sill to rafter plate, with 1x6-inch ribbons housed into studs to support the floor joists and tie the studs together. No girts or other horizontal grained members should intervene. The floor joists should be securely spiked to the studs.</p> <p>No bridging is required.</p> <p>Once in the height of each story, the stud walls should have a row of 2x3-inch bridging cut in diagonally between the studs and securely spiked to them.</p> <p>No sheathing is required.</p> <p>The outer face of studs and the sides for a distance of 2 inches back from the face, should be thoroly coated with a pitch or asphalt compound, to interpose waterproofing between the stucco and the framework.</p> <p>After the stucco lath has been back-plastered, the air space between the studs may be divided by applying between the bridging and the inside plastering, quilting or other insulating material, fastening it in place by nailing wood strips over the fold in the paper, on the sides of the studs.</p> <p>Unless metal furring is used, or a lath of which metal furring forms an integral part, the wall should be furred over the waterproof paper with 1x2-inch strips placed vertically 12 inches on centers and about openings.</p> <p>Sills of openings should have ample slope and projection and undercut drips.</p>	



View of House before Stuccoing



View of House after Alteration and Stuccoing

RESIDENCE OF ALBERT SCHMIDS, SPRINGFIELD, O.

F. MILLER, ARCHITECT C. OHMART, STUCCO CONTRACTOR

New Homes for Old

THE renovation of old buildings by means of stucco is worth the builder's attention. As a rule, stucco is almost magical in transforming an ugly exterior into an attractive one.

In renovating the exterior of an old brick (or stone) building, the stucco can be applied directly to the brick. The brick should be thoroughly cleaned with a weak solution of muriatic acid before the stucco is applied. The brick should also be backed. The old mortar joints should be picked out $\frac{1}{2}$ to $\frac{3}{4}$ -inch from the face of the brickwork, and when the first coat is applied, it is forced into these crevices and forms an excellent bond. Before applying the plaster, the brick must be thoroughly saturated with water, so that none will be absorbed from the plaster.

When the old brickwork has been pointed, it is necessary to back the brick, although builders sometimes prefer to use wire or expanded metal lath to key the stucco to the brick. In the latter case metal furring strips are attached to plugs driven in the joints of the brickwork, flush with the surface, and the wire is fastened to these strips.

When "overcoating" old frame houses, they should be gone over to determine if the frame-work will justify the improvement. Foundations should be examined to see if they will bear the additional weight of the stucco. Proper footings should be provided. Special attention should be paid to the studding. If it is decided that overcoating is practical, the partitions and outside walls should be lined up and brought into plumb. Poor weatherboarding should be removed, and furring and metal lath applied over the sheathing. It may be advisable to tear off the sheathing, the furring can then be fastened direct to the studding after bracing between the studs.

When furring is used over old siding, provision should be made for extending the old window and door frames to correspond with the increased thickness of the wall. In some cases the plaster is turned into the old frames in such a way as to make a stucco recess. When the furring is fastened to the studding it is not necessary to provide for extending the window and door frames, as the new stucco finish will be in the position of the old weather boarding.

A THIRD GROUP OF STUCCO HOMES IN KANSAS CITY
ERECTED FOR HOME INVESTMENT CO.
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ATLAS-WHITE is a true Portland Cement of the same high quality as gray Atlas Portland Cement. The contractor will find it of advantage in his work, not only as a beautiful, pure-white finish for stucco, but also for making pre-castments, such as masonry trim, garden furniture, and for pointing and setting stone, tile and brick, where a white joint is desired. Atlas-White is non-staining and should be used for setting all fine texture stone, both exterior and interior.

By mixing colored aggregates or mineral pigments with Atlas-White Cement for the final stucco coat, many charming mellow tones are available, adding greatly to the distinctiveness and individuality of stucco for home construction. Atlas-White gives the true color value of the pigments and aggregates used, making possible the soft cream and buff effects and reproductions of fancy stone and marble that are not possible with gray Portland Cement.

Information for Contractors

It has been the aim of this book to cover the main features of stucco building. There are details of this construction not included about which the contractor may desire information. We shall be pleased to advise the contractor on such points at any time, and to furnish full information on stucco work for other purposes than herein described.

Books on stucco which will be found of value in discussing stucco with your clients are—

"Information for Home Builders" "Building a Bungalow"
"New Homes for Old" "Choosing the Garage"

Copies of these will be sent to any contractor upon request.

The Atlas Portland Cement Company

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